TCT-764

ECIENTIFIC IMPLICATIONS OF THE TRANSPALVEAL JENAVALE IN AN IN VITRO HYDRODYNAMIC TEST MODEL

Stephan Enzinger1, Stephan Achenbach2, Jochen Boergermann1, Jan Gummert1, Smiru R. Jategaonkar3, Maximilian Kuetting4, Annika Schuhbaeck5, Ulrich Steinseifer6, Marco Luciano Rossi1, Paolo Pagnotta1, Cristina Barbato2, Margherita Soldi1, Patrizia Presbitero2
1Istituto Clinico Humanitas, Rozzano, Milano, Italy, 2Istituto Clinico Humanitas, Rozzano, Milano, Italy, 3Istituto Clinico Humanitas, IRCCS, Milano, Italy, 4Hebrew University-Hadassah Medical School, Jerusalem, Israel, 5Hebrew University-Hadassah Medical Center, Jerusalem, Israel, 6Institute for Applied Medical Engineering, RWTH Aachen University, Aachen, NRW

Background: CT analyses of patients with severe aortic stenosis reveal that in the majority of patients, the aortic annulus is not circular, but displays a certain degree of eccentricity. All currently available percutaneous heart valve prostheses are circular in shape. The aim of this study was to assess the performance of the transapical JenaValve® in an in vitro hydrodynamic test comparing circular and eccentric aortic annuli.

Methods: Based on CT data from 123 TAVI patients, a mean annulus eccentricity (eccentricity=short diameter/long diameter) of 0.84 was determined. Two models of aortic roots with valve leaflets, one circular in shape and one displaying an eccentricity of 0.84 were created based on the Reul model. The molds for the models were 3D-printed and cast from silicone. Valve hydrodynamics were evaluated in theCVE pressure duplicator by analyzing high-speed video recordings of leaflet motion, flow, and pressure data. Measurements were performed at 50% cardiac output, 80, 100 and 120 mmHg of mean aortic pressure and 120, 70 and 110 BPM, respectively. Experiments were repeated in a cross-over design.

Results: The analysis performed with transapical JenaValve prostheses implanted in a circular annulus (n=3) or an annulus with 0.84 eccentricity (n=3) showed no significant difference in valve performance with regard to regurgitation volume for a commercially available percutaneous valve whilst implanted in a circular and eccentric annulus. This may be due to the slim and flexible valve stent design, the use of a native porcine root valve as opposed to single pericardial lea.

Conclusions: First experimental in vitro study demonstrating no significant difference in valve performance with regard to regurgitation volume for a commercially available percutaneous valve whilst implanted in a circular and eccentric annulus. In the circular model the JenaValve showed an average regurgitation volume (RV) of 40cm3:0.12cm corresponding 4.69%±0.20% of the total stroke volume (SV). An increase of RV to 3.57cm±1.61cm corresponding 4.81%±2.05% of the total SV was seen in the oval annulus, representing only a small increase. Cross-over hydrodynamic testing showed similar results.

TCT-765

Atrial Fibrillation, Stroke and Mortality in TAVI

Lior Yankelzon1, Ariv Steinvil1, Shmul Bunai1, Gad Keren1, Liron Gershovitz1, Ariel Finkelstein1
1Tel-Aviv Medical Center and Tel Aviv University, Tel Aviv, Israel, 2Tel-Aviv Sourasky Medical Center, Tel Aviv, 3Tel Aviv Sourasky Medical Center, Tel Aviv, Israel

Background: Transcatheter Aortic Valve Implantation (TAVI) has become a accepted approach for patients with severe symptomatic aortic stenosis (AS) and high operative risk. This approach may be hampered by high occurrence of stroke during and after the procedure. With the association of atrial fibrillation (AF) and CVE well documented, the objective of the present report was to evaluate the effect of pre-procedural and new onset atrial fibrillation (NOAF) on mortality and stroke outcomes in patients undergoing TAVI.

Methods: We analyzed the data on 380 consecutive elective patients undergoing TAVI between September 2008 and April 2013 in our interventional cardiology department. Post-procedural AF was defined as new onset AF occurring within 30 days of the index procedure. Follow up time was defined as the time from the procedure to an adverse outcome, either mortality or stroke.

Results: The mean follow-up time was 383 and 526 days for the outcome of CVE and mortality respectively. For the total duration of follow-up, CVE and mortality occurred in 19 (10%) and 68 (17.9%) patients respectively. At 30 days follow-up, NOAF occurred in 31 (8.2%) cases and was not associated with higher rate of CVE (0.4% vs. 3.2% of NOAF, p=0.093, p=0.36 in a multivariate analysis after adjustment for mortality (2.2% vs. 3.2%, p=0.71)). At 12-month follow-up no difference in CVE rate or mortality was observed between groups. In contrast, patients with background diagnosis of AF had an increased rate of CVE at 12 months follow-up (1.5% vs. 6.8%, p=0.007; p=0.014 after adjustment for confounding risk factors for CVE on univariate analysis and binary logistic regression (6.1% vs. 25.4%, p=0.001). The increased rate of CVE and mortality was not driven by difference in baseline characteristics or risk factors for CVE. CHA2DS2VACS score was similar in both groups (4.62±1.1 vs. 4.77±1.08, p=0.243).

Conclusions: The present data suggest that new onset atrial fibrillation in the first 30 days after TAVI does not increase significantly stroke or mortality rate at 30 days and 1 year follow up. Importantly, prior diagnosis of AF significantly increases the rate of stroke and mortality, regardless of known risk factors and baseline characteristics.